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Thunder*ION*

Static Neutralising System

GB User's Manual **2**

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Preface

This manual must be available at all times to staff operating the equipment.
Read through the entire manual before installing and commissioning the product.
Follow the instructions set out in this manual to ensure proper operation of the product and to retain your entitlement under the guarantee. The terms of the guarantee are set out in the Simco-Ion Netherlands General Terms and Conditions of Sale.

This manual describes the installation and usage of the anti-static system Thunder*ION*.
Where the word 'bar' or Thunder*ION* is used in this manual, it refers in all cases to the Thunder*ION* 2 series, standard or IQ versions.

Explanation of symbols

Warning
Indicates special information for preventing injury or significant damage to the product or the environment.

Danger
Indicates information for preventing electrical shocks.

Note
Important information for making the most efficient use of the product or for preventing damage to the product or the environment.

1. Introduction

The Thunder*ION* is designed to neutralise the static charge of sheets, webs and other flat materials. The bars can be used in combination with a 24 V DC power supply.
The 24 V is converted in the bar into a positive and negative high voltage.
The high voltage generates an electrical field at the emitters of the anti-static bar, which causes the air molecules around the emitters to be converted to positive and negative ions.
When an electrostatically-charged material comes close to the bar, electrons are exchanged until the material is neutral.

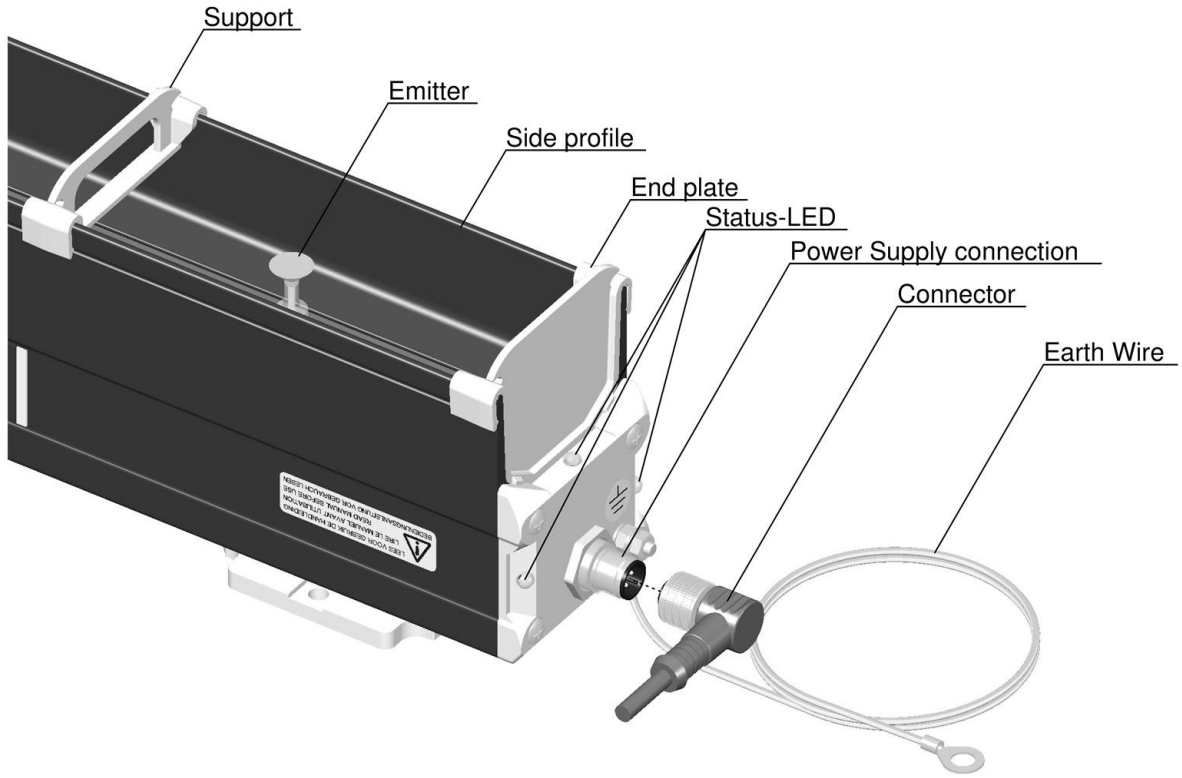


Fig. 1 Thunder*ION*

2. Description and operation

In the standard Thunder*ION* analog interfacing is possible through the M12 connector. Remote on and off switching and high voltage OK signalling are available..
In the Thunder*ION IQ* the bar interfaces with auxiliary equipment through a serial protocol. It must be connected to compatible Simco-ION IQ equipment.
By default, the bar operates with a pulse frequency of 5 Hz. This pulse frequency is used to produce positive and negative ions alternately. For special applications this pulse frequency has to be adjusted for optimum discharge results.
In the standard version it can be adjusted by Simco-Ion with a special tool through the M12 connector. In the IQ version it can be adjusted through the settings menu in the IQ Easy Manager.
The anti-static bar is supplied with replaceable emitters. The side panels and end plates are replaceable as well. The replaceable parts makes it easier, quicker and more convenient to clean the bar.

3. Safety

Warning:

- Work on the equipment must be carried out by a skilled and qualified electrical engineer according to the applicable national and local regulations.
- The anti-static bar is only designed for neutralising electrostatically charged surfaces.
- When working on the equipment, always disconnect the power supply to the equipment.
- Make sure that the equipment is properly earthed (see installation).
  Earthing is needed to ensure safe and proper operation.
- The emitters are sharp and can cause physical injury.
- High voltages are hazardous for people who have a pacemaker.

The high-voltage emitters (30 kV) are limited to a current of 150 µA, which means that they are electrically safe to touch and shockproof.
Coming close or making contact with a emitter from one polarity can have the effect that a person will become electrostatically charged and gets a shock reaction when the person discharges to other earthed or uncharged objects (maintain a distance of at least 300 mm from the bar).

When an overload occurs the high voltage will be regulated down until the max. internal current level is reached.

- The concentration of ozone generated varies per application and must be checked.
- If changes or modifications, etc. have been made without prior consent in writing, or if original parts have not been used for repairs, CE/UL approval for the equipment will be withdrawn and the equipment will no longer be under guarantee.

4. Technical specifications

Required power supply*

Supply voltage	21–27 V DC
Current consumption	Max. 2 A DC
Standard cable	1Ω/10m
Connection	M12 connector, 5-pin

Output

Output voltage	Max. 30 kV positive and negative
Current per emitter to earth	<150 uA
Emitter material	Special alloy

Environment

Operating environment	Industrial
Ambient temperature	0 – 55°C
Cooling	Convection
Operating distance	300 – 1000 mm

Local functions

Indication of pulse frequency setting	Flashing red and yellow LEDs during start-up of the bar
[On] signaling	Green LED
[Error] signaling	Red LED lights up in the case of an internal overload or short circuit. Red LED flashes when the HV OK output is overloaded or other errors have been detected (e.g. supply voltage too low, overheated power supply)
[Warning] signaling (only IQ version)	Orange LED when Bar needs to be cleaned

Remote functions
(standard version)

Remote On/Off input	Switching high voltage on and off Control voltage specifications: 10 V DC, 10 mA min. 30 V DC, 25 mA max.
Bar operating OK output (HV OK)	Indicates that the bar is operating correctly (when high voltage is switched on). Uo= Supply voltage — 1 V, Max. 50 mA

Remote functions (IQ version)	Through the IQ Easy manager the bar can be monitored and controlled (see manual IQ Easy manager)

Mechanical

Effective bar length	250 mm to 4750 mm
Dimensions (WxHxL)	61 mm x 114 mm x total length (Eff. Length + 195 mm)
Weight	0.8 kg + 2.4 kg/m
Housing	Plastic
Mounting material	Brackets

*** The power supply must be a Limited Power Supply or NEC Class 2 power supply. The output of the power supply must be properly grounded! (See para. 4.4.1.) An LPS certified power supply has a limited output power, as a result of which it always generates a safe output voltage.**

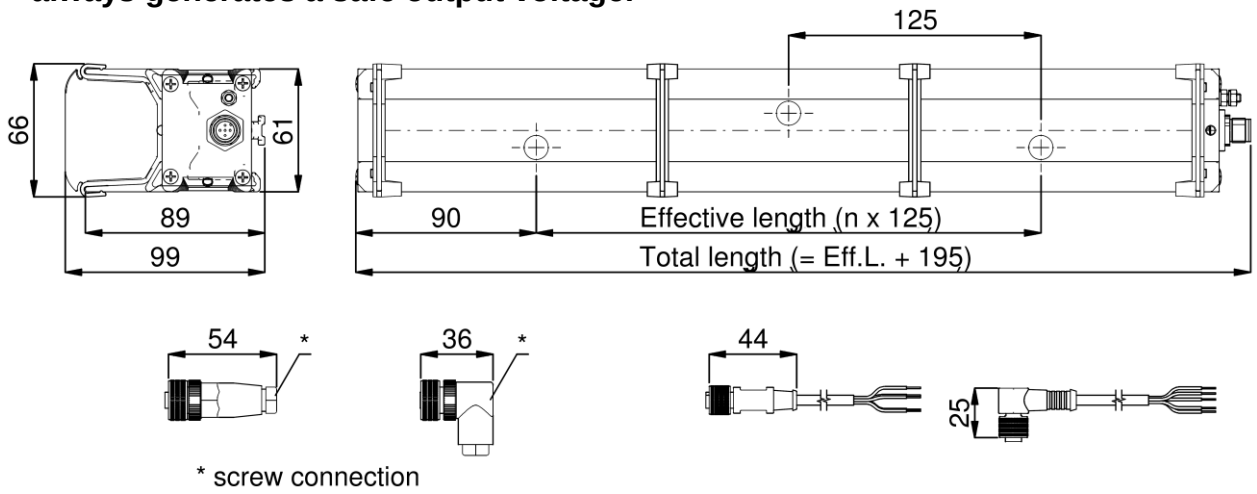


Fig.2 Thunder*ION dimensions and optional connections*

5. Installation

- **Electrical installation and repairs must be carried out by a skilled electrical engineer according to the applicable national and local regulations.**
- **The equipment must be properly earthed. Earthing is required to ensure safe and proper operation and to prevent electrical shocks upon contact.**
- **Disconnect the power supply before carrying out work on the unit.**
- **The anti-static bar must only be powered by a Limited Power Source (LPS) or NEC Class 2 power supply. An LPS certified power supply has a limited output power, which means that it always generates a safe output voltage.**
- **Only connect the specified voltages to the circuits.**

The 0 V of the power output must be earthed correctly (see section 5.2.3.).

The anti-static bar can be powered by a 24 V DC power supply already available on the machine (if it meets the above requirements), but also by a power unit from Simco-Ion Netherlands.
The power units recommended by Simco-Ion Netherlands:

Part number	Description
4524001000	Desktop, 100–240 V AC to 24 V DC for 1 Thunder*ION* (IP40).
4510001400	Control module for max. 4 Thunder*ION*'s (IP 54)
7519020425	DIN rail power supply 100–240 V AC to 24 V DC for 1 Thunder*ION* (IP20).
7519020430	DIN rail power supply 100–240 V AC to 24 V DC for 1 Thunder*ION* (IP20).
7519020435	DIN rail power supply, 100–240 V AC to 24 V DC for a maximum of 5 Thunder*ION's* (IP20).

5.1. Prior check

- Check that the equipment is free from damage.
- Check that the details on the packing slip correspond to the details of the product received.

If you have any problems and/or doubts, please contact Simco-Ion Netherlands or the agent in your region.

5.2. Fitting the anti-static bar

☞ **Note:**

- **Conductive machine parts in the vicinity of the anti-static bar have a negative influence on its operation.**
- **For optimum results, the anti-static bar must be fitted as per Figure 3.**
- **Mount the bar such that the emitters are at a distance of at least 50 mm from electrically conductive machine parts.**
- **For minimum distances, see Figure 4.**
- **Use the supplied mounting brackets**

Fit the anti-static bar:

- Directly in front of the place where static electricity causes problems.
- With the emitters facing in the direction of the material to be neutralised.
- In places where the material is neutralized, it must have a layer of air under it.

- The correct distance from the anti-static bar to the material should be established by experiment (for operating distance see technical specifications).
  Normally the effectiveness of the bar increases with decreasing the distance to the web (not below minimum distance!).
- The emitters of the anti-static bar must not be covered.

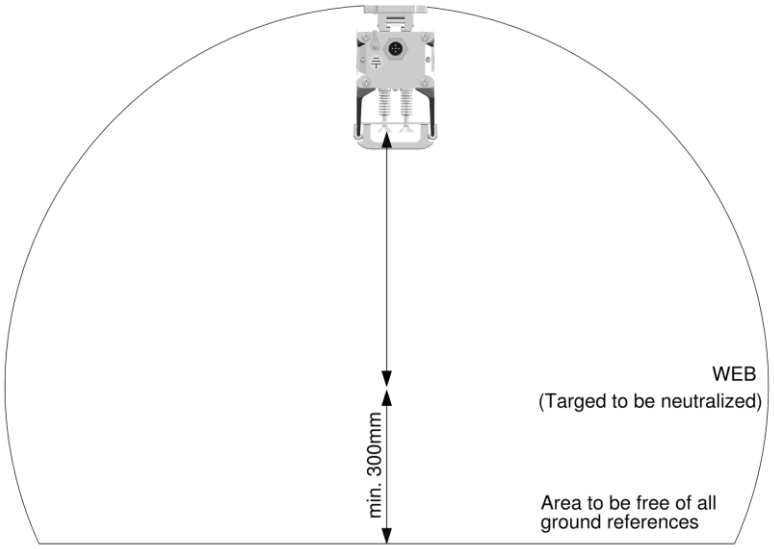


Fig.3

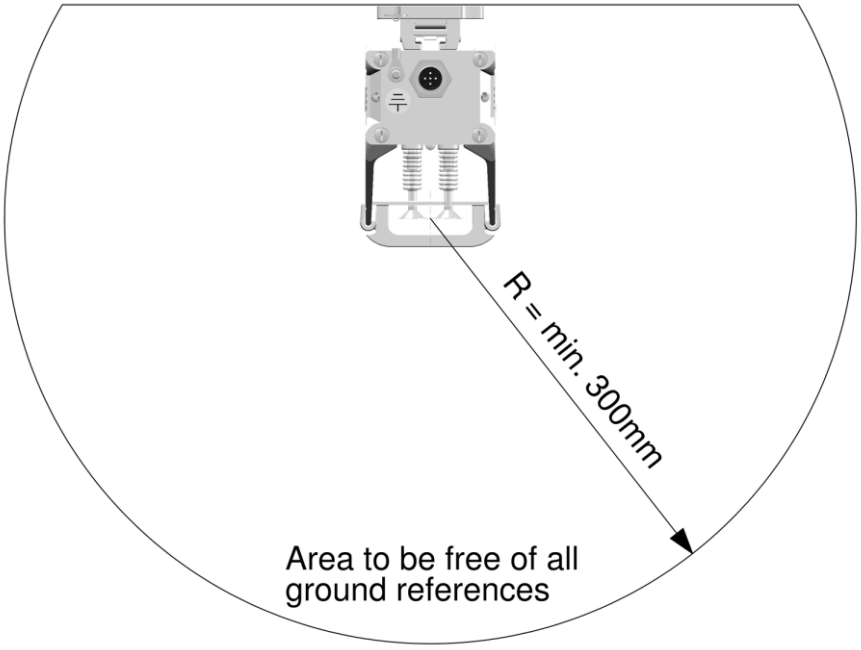


Fig 4

5.3. Bracket Bars, mounting options

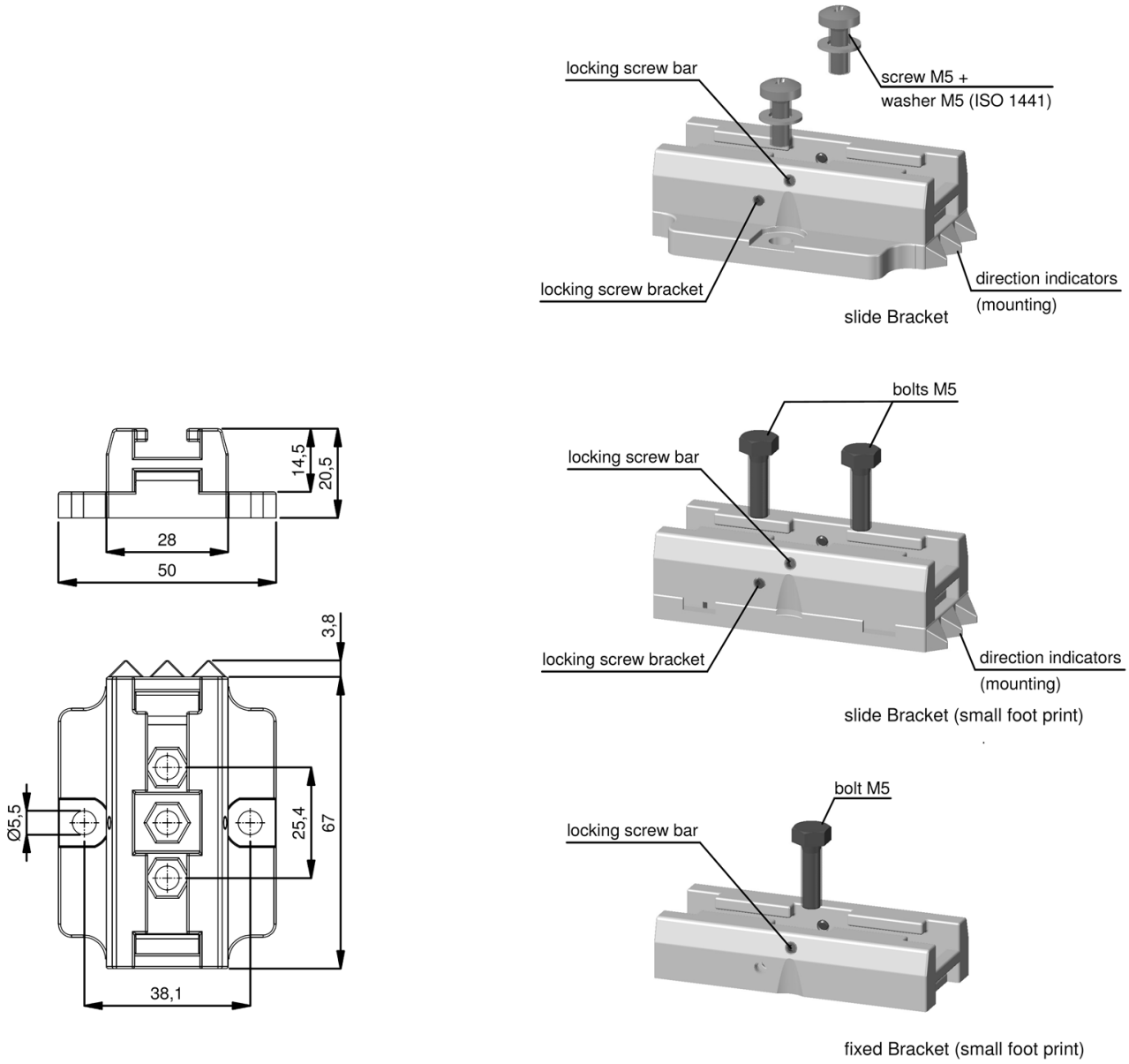


Fig. 6

5.4 Mounting *ThunderION* (slide bracket)

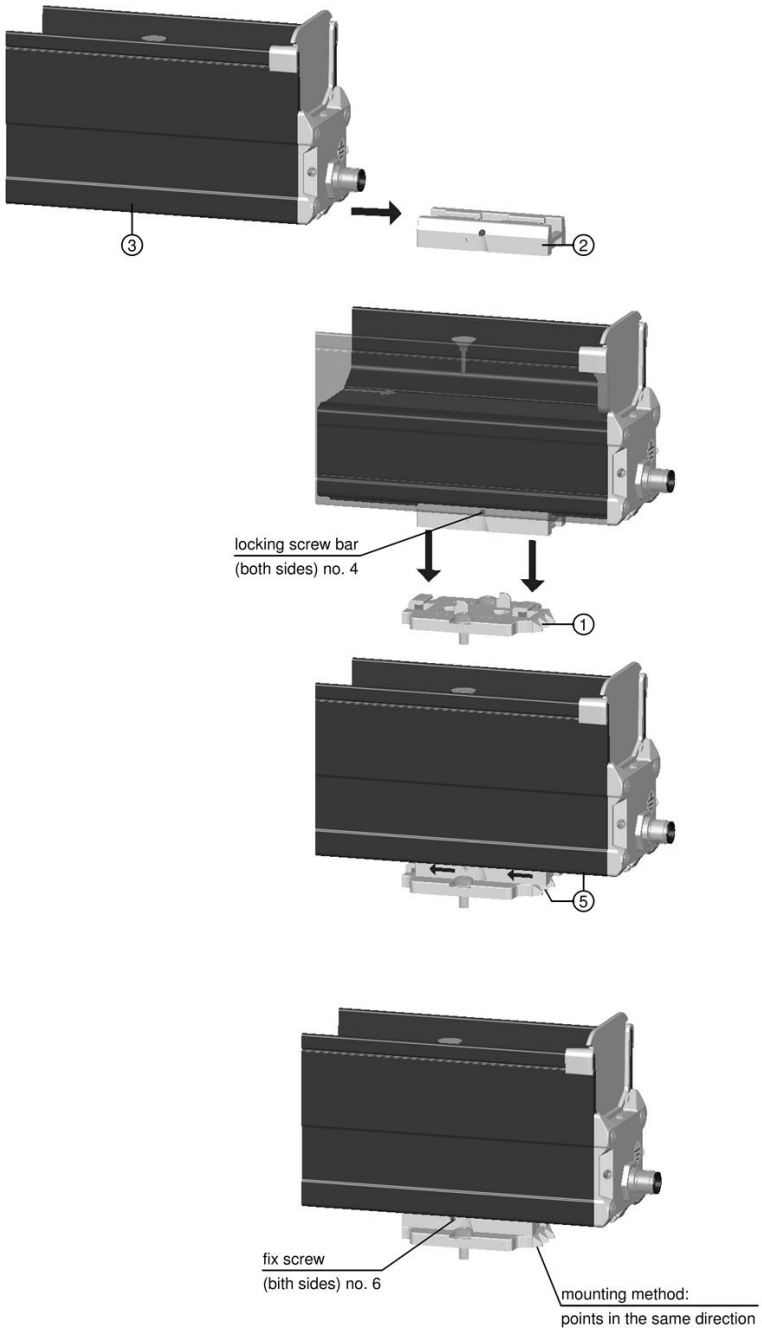


Figure 5: Mounting with slide bracket

5.4.1- Mount the anti-static bar using the mounting materials provided:
(see fig. 3, 4 and 5)

5.4.2- Mount the feet (nr.1) to the machine, keeping the triangles (mounting method) in the same direction.

5.4.3 Slide the brackets (nr.2) onto the anti-static bar (nr.3).
Keep the distance(s) between the brackets (nr.2) and the mounting feet (nr.3) equal and fixate the bracket (nr.2) using the adjusting screw (nr.4).

5.4.4 Set the anti-static bar with the brackets (nr.5) onto the mounting feet and slide the entire device in the opposite direction of the three points (mounting method).

5.4.5 Secure the anti-static bar in the mounting feet by turning the adjusting screws (nr.6) into the bracket. You only need to secure the two outer brackets.

5.4.6 Connect the M12-connector of the power supply cable to the anti-static bar and lead the cable safely to the power supply.

5.5 Dismounting (slide bracket)

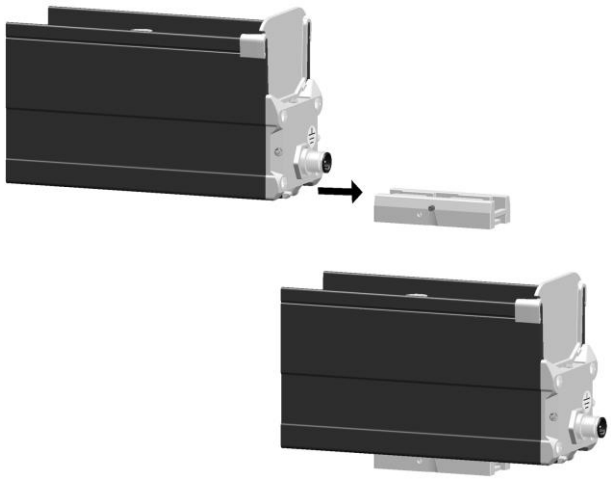


Figure 6: Dismounting with slide bracket

5.5.1 Disengage the M12 connector on the side of the anti-static bar.
5.5.2 Unscrew the adjustable screws (nr.6) from the brackets.
5.5.3 Slide the anti-static bar with the brackets of the mounting feet in the direction of the three points (direction indicators (5.3)) until the stop; pull the anti-static bar off the mounting feet in a perpendicular manner.

5.6. Connecting the anti-static bar

Warning:

- **Note the warnings at the start of this chapter.**

5.6.1. Connecting the *ThunderION* to the Desktop power supply

- Connect the external yellow/green wire to an earthed part of the machine.
- Connect the cable with the M12 connector from the Desktop power supply to the anti-static bar.
- Connect the power cable.

5.6.2. Connecting the *ThunderION* to the DIN rail power supply / external power supply & remote on/off input

- Attach the wiring as shown in Figure 5.

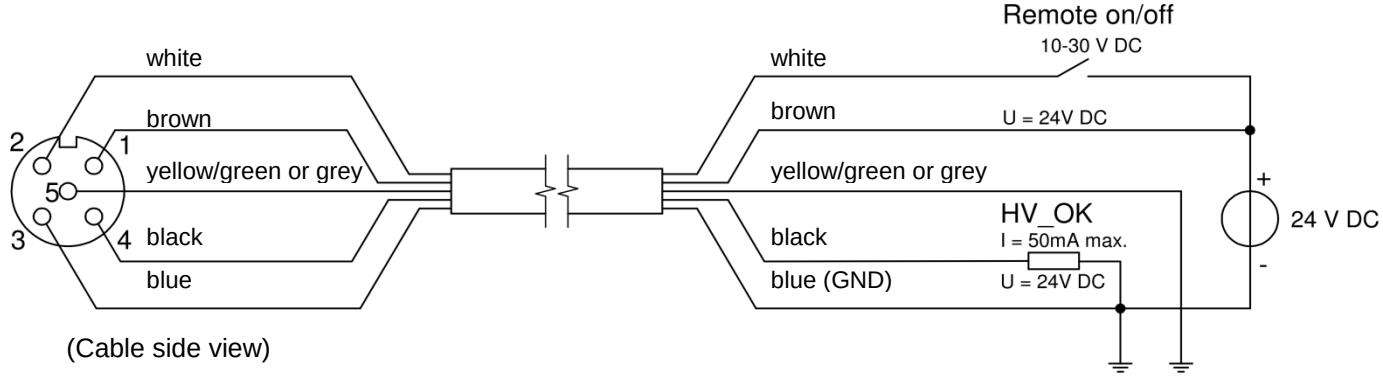


Figure 6: Wiring of the bar

For personal protection and to ensure proper functioning, the grey and the blue wire must ***both* be connected to earth.**
In the Simco-Ion Desktop power supply, these connections have already been made.

☞

Pin 2 (white) is the remote On/Off input and can be used for external switching on / off the bar. When not needed connect pin 2(white) to the 24V DC supply voltage

5.6.2.1. Connecting High voltage operating OK signaling

It is possible to check the bar's functioning remotely with a PLC, for instance. For this purpose, an optocoupler output is available on the connector (max. load 30 V DC, 50 mA).
Connect the external signaling to pins 3 and 4 of the connector according to the diagram (Bar operating OK: see Appendix 1).

5.6.3. Connecting the *ThunderION* IQ bar

- Connect the standard available M12 male –female cables to the bar and the auxiliary equipment.

6. Commissioning

⚠ **Warning:**
- **High voltage can be dangerous to people with a pacemaker.**
- **Check that the bar is earthed correctly (see para. 5.6.1).**
- **Coming close to one polarity can lead to unpleasant discharge shock.**

☞**Note:**
- The anti-static bar does not work if the emitters are covered.
- Remove the protective cap from the anti-static bar.
  The purpose of the protective cap is to protect the emitters during transport and installation.

6.1 *ThunderIon*

Once a 24 V DC power supply is available and the remote on/off input has been activated, the anti-static bar will switch on.
With a standard *ThunderIon* desktop power supply, the remote on/off is already connected to the 24V power supply. If this power supply is used, the bar will therefore switch on immediately.

Switch on the power supply.
Activate the Remote on/off input

6.2 *ThunderIon IQ*

When the auxiliary equipment is powered and the RUN command has been given the bar will switch on.

7. Functional check

The colour of the status LED's on the anti-static bar can be used to determine the status of the anti-static bar.

Operation	Bar LED Thunder*ion*	Bar Led Thunder*ion IQ*
Standby	Green flashing	Green flashing
In operation	Green on	Green on
Overloaded	Red on	Red on
Clean bar warning	N.A.	orange
HV OK output overload	Red flashing	N.A.
Internal error	Red flashing	Red flashing
No communication	N.A	Red flashing (quick)

N.A: not applicable

Possible causes of overload are:
- Fouling of the anti-static bar.
- Direct contact between conductive material and the emitters.
- The anti-static bar has been fitted too close to conductive (machine) parts.

Possible causes of HV OK output overload are:
- Short circuit of the HV OK output signal
- Excessive load of the HV OK output signal

7.1. Power up & pulse frequency indication Thunder*ION*

- Green flashing quick for 2 seconds
- Pulse-frequency indication:
  Red flashing quick 10x,
  green flash (amount of flashes = pulse frequency [Hz])
  Red flashing quick 10x,
- Standby (green flashing) or operating mode (green)

7.2. Power up & communication checkThunder*ION IQ*

- Green flashing quick for 2 seconds
- Communication check
  green flash for maximum 5 sec.
- Standby (green flashing), operating mode (green)
  or no communication (red flashing quick)

7.3. External: Bar HV operating OK output Thunder*ION*

The external Bar HV operating OK output is active if the following three conditions are met:
- the supply voltage is present on the M12 connector
- the bar is Remote On/Off input is activated on the M12 connector,
- there is no error.

7.4. Neutralising

To measure the efficiency of the anti-static bar, a field-strength meter can be used.
Connect the field-strength meter to earth, and maintain a minimum distance of 30 cm to the anti-static bar.
Measure the static charge on the material before and after it has passed the Thunder*ION*.
The charge measured should be minimized after the product has passed the anti-static bar.

8. Maintenance

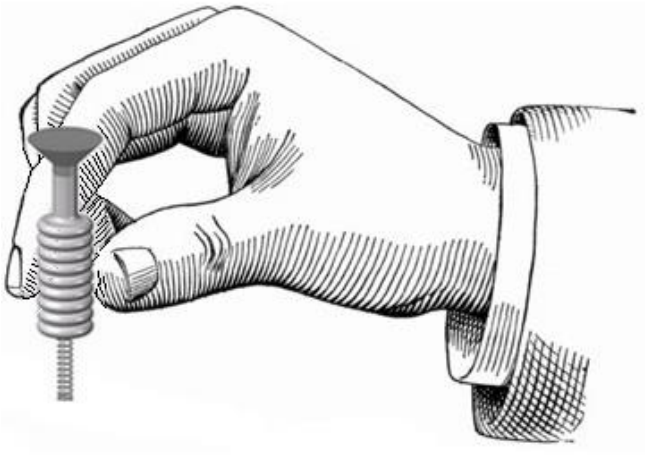
⚠ **Warning:**

- **When working on the equipment, always disconnect the power supply to the equipment.**

☞ **Attention:**

- **Do not damage the emitters.**
- **Let the bar and emitter-parts completely dry before switching on the bar.**

- Keep the anti-static bar clean.
- If fouled: clean the anti-static bar with a hard non-metal brush.
- If fouled: clean the anti-static bar with a block brush and isopropyl alcohol.
  Blow the anti-static bar completely dry before use.
  Veconova 10 may also be used in the event of stubborn fouling (www.eco-nova.nl)
- During cleaning, clean the black mounting surface of the emitters as well as the rest of the housing also the external surfaces).
  For easy cleaning the side panels, support brackets, the end plates and the emitters can easily clicked off.
  For removing the emitters pull the plastic emitter holder instead of pulling the sharp emitter.
  After removing the emitter be sure no cleaning agent or contamination will come in te connection hole for the emitters. Covers are available for easy protection during cleaning (Par 12).
- The emitters itself can be off line cleaning in a cleaning agent (ultrasonic bath) or easily replaced by new emitters. The emitters are always a set of the metal emitter and the plastic holder (see Par 11 spare parts)



9. Faults

Table 1: Faults

Signaling	Problem	Cause	Remedy
Green Continuous	No/poor ionisation High voltage on emitters (can be checked with a Tension)	Bar is fouled.	Clean bar.
		Emitters are damaged.	Replace emitters.
HVOK active (external)		Emitters are covered.	Remove the cover.
		Position of neutralizing not OK	Change position
No LED	No high voltage on emitters.	Cable, connectors or power supply not connected	Restore supply voltage
HVOK not active (external)		Bar faulty.	Return bar
Green flashing HVOK not active (external)	No high voltage on emitters.	Remote function set to Off	Set Remote to On.
Red Continuous	(lower) High voltage on emitters	Bar placed too close to conductive parts	Move bar.
HVOK not active(external)		Bar is extremely fouled.	Clean bar.
		Bar faulty.	Return bar.
Red flashing	Internal hardware error	Supply voltage too low	Check power supply and length of the cable
		Internal Temp too high	Tamb> 55C or bar faulty

10. Repair

Warning:

- **When working on the equipment, always disconnect the power supply to the equipment.**
- **Repairs must be made by a skilled electrical engineer.**
- **When opening the equipment, parts under hazardous voltage can be touched.**

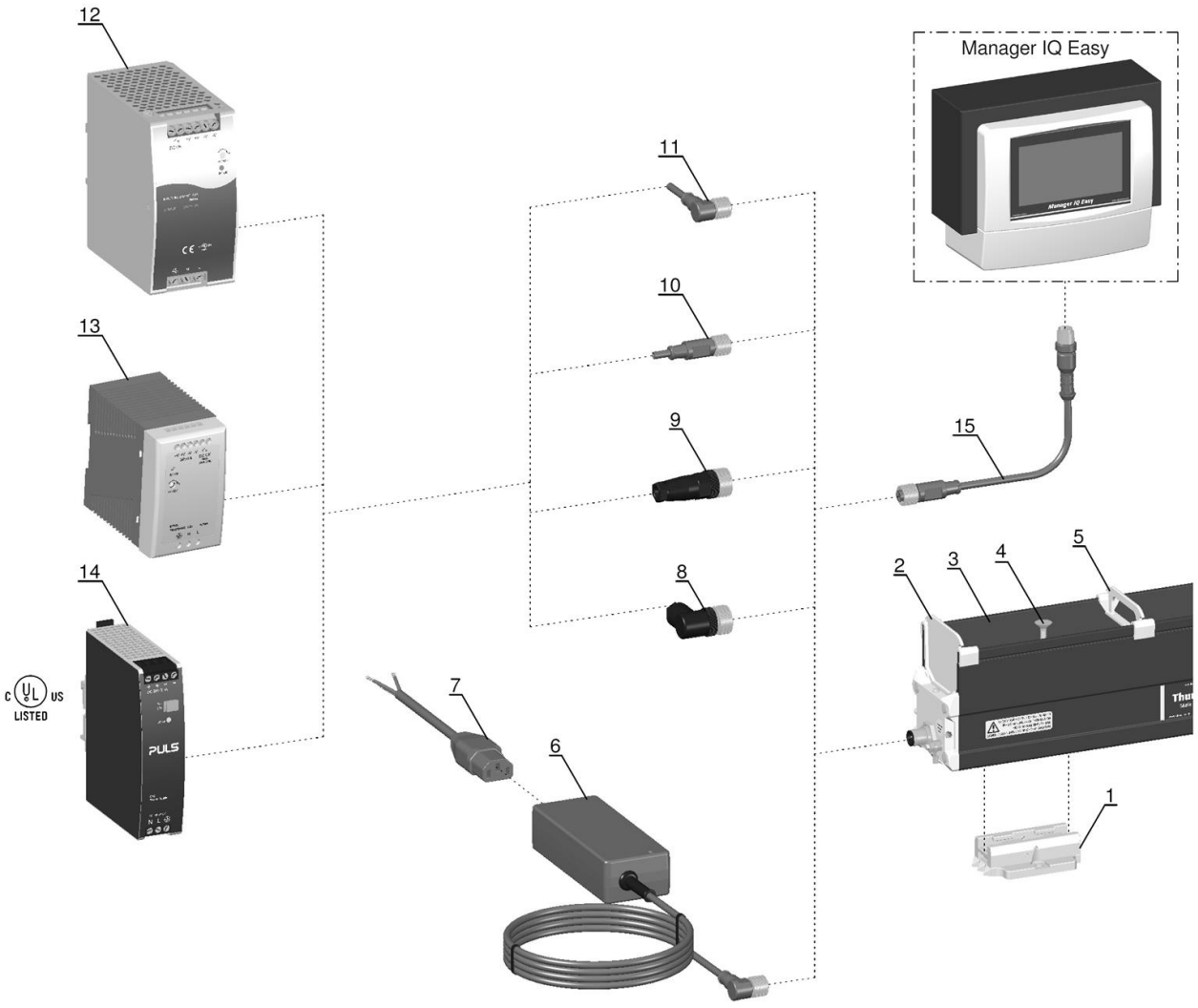
SIMCO (Nederland) B.V. recommends that you return the Thunder*ION* anti-static bar if repairs are required.
To request an RMA form for this purpose, please send an e-mail to service@simco-ion.nl.
Pack the equipment well and clearly state the reason for return.

11. Disposal

Comply with locally applicable environmental and other regulations when disposing of the product.

12. Spare parts

Pos.	Part number	Description
1a	4532000100	Mounting foot
1b	4532001010	Mounting feet set (2 pieces)
1c	4532001020	Mounting feet set (3 pieces)
2	7509004160	Endplate
3	7509004020	Side profile
4	4509001030	Assembly emitter
5	7509004170	Support
6	4509001000	Power Supply 100-240V/24VDC
7	9146340620	Power cable - IEC 320 EN 60320 C19 (V) – 2 m
8	7519020355	5-pin right-angle M12-connector (with screw connector)
9	7519020350	5-pin straight M12-connector (with screw connector)
10a	7519020365	5-strand cable with straight M12-connector, 5 m
10b	7519020366	5-strand cable with straight M12-connector, 10 m
11a	7519020375	5-strand cable with angled M12-connector, 5 m
11b	7519020376	5-strand cable with angled M12-connector, 10 m
12	7519020435	DIN rail power supply, 100 - 240 V AC to 24 V DC 10A.
13	7519020425	DIN rail power supply, 100 - 240 V AC to 24 V DC 4A.
14	7519020430	DIN rail power supply, 100 - 240 V AC to 24 V DC 3,3A, (UL listed)
15a	7519020383	Cordset M12 fem. – M12 male 5m straight (shielded)
15b	7519020384	Cordset M12 fem. – M12 male 10m straight (shielded)
15c	7519020386	Cordset M12 fem. – M12 male 5m straight (cable chain)
15d	7519020387	Cordset M12 fem. – M12 male 10m straight (cable chain)
15e	7519020391	Cordset M12 fem. – M12 male 5m straight
15f	7519020392	Cordset M12 fem. – M12 male 10m straight
16	9240910520	Cover M5x25 blank (emitter holder protection cleaning bar)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